



## SEQUENCE LISTING

<110> SMEAL, TOD R.  
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JALLAL, BAHJA  
ZOZULYA, SERGEY  
GISHIZKY, MIKHAIL L.

<120> GEF-H1b: BIOMARKERS, COMPLEXES, ASSAYS AND THERAPEUTIC  
USES THEREOF

<130> 034536-0407

<140> 10/611,671

<141> 2003-07-02

<150> 60/460,053

<151> 2003-04-04

<150> 60/393,600

<151> 2002-07-05

<160> 52

<170> PatentIn Ver. 2.1

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<223> Description of Artificial Sequence: Synthetic  
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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
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<400> 2

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Ser Leu Arg Ser Lys Thr Thr Ile Arg Glu Arg Pro Ser Ser Ala Ile
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Tyr Pro Ser Asp Ser Phe Arg Gln Ser Leu Leu Gly Ser Arg Arg Gly
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 100 105 110  
 Ser Leu Ile Asp Glu Ala Glu Val Ile Tyr Ser Glu Leu Met Ser Asp  
 115 120 125  
 Phe Glu Met Asp Glu Lys Asp Phe Ala Ala Asp Ser Trp Ser Leu Ala  
 130 135 140  
 Val Asp Ser Ser Phe Leu Gln Gln His Lys Lys Glu Val Met Lys Gln  
 145 150 155 160  
 Gln Asp Val Ile Tyr Glu Leu Ile Gln Thr Glu Leu His His Val Arg  
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 Thr Leu Lys Ile Met Thr Arg Leu Phe Arg Thr Gly Met Leu Glu Glu  
 180 185 190  
 Leu His Leu Glu Pro Gly Val Val Gln Gly Leu Phe Pro Cys Val Asp  
 195 200 205  
 Glu Leu Ser Asp Ile His Thr Arg Phe Leu Ser Gln Leu Leu Glu Arg  
 210 215 220  
 Arg Arg Gln Ala Leu Cys Pro Gly Ser Thr Arg Asn Phe Val Ile His  
 225 230 235 240  
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 245 250 255  
 Gln Met Cys Lys Thr Tyr Ser Glu Phe Cys Ser Arg His Ser Lys Ala  
 260 265 270  
 Leu Lys Leu Tyr Lys Glu Leu Tyr Ala Arg Asp Lys Arg Phe Gln Gln  
 275 280 285  
 Phe Ile Arg Lys Val Thr Arg Pro Ala Val Leu Lys Arg His Gly Val  
 290 295 300  
 Gln Glu Cys Ile Leu Leu Val Thr Gln Arg Ile Thr Lys Tyr Pro Leu  
 305 310 315 320  
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 325 330 335  
 Gln Asp Leu Thr Thr Ala Leu Gly Leu Val Lys Glu Leu Leu Ser Asn  
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Val Asp Glu Gly Ile Tyr Gln Leu Glu Lys Gly Ala Arg Leu Gln Glu  
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 370 375 380  
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 Tyr Leu Arg Arg Ile Lys Met Glu Leu Gln Gln Lys Asp Arg Ala Leu  
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 Val Glu Leu Leu Arg Glu Lys Val Gly Leu Phe Ala Glu Met Thr His  
 530 535 540  
 Phe Gln Ala Glu Glu Asp Gly Gly Ser Gly Met Ala Leu Pro Thr Leu  
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 Pro Arg Gly Leu Phe Arg Ser Glu Ser Leu Glu Ser Pro Arg Gly Glu  
 565 570 575  
 Arg Leu Leu Gln Asp Ala Ile Arg Glu Val Glu Gly Leu Lys Asp Leu  
 580 585 590  
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 595 600 605  
 Leu Pro Leu Glu Pro Asp Ser Gly Gly Asn Thr Ser Pro Gly Val Thr  
 610 615 620  
 Ala Asn Gly Glu Ala Arg Thr Phe Asn Gly Ser Ile Glu Leu Cys Arg  
 625 630 635 640

Ala Asp Ser Asp Ser Ser Gln Arg Asp Arg Asn Gly Asn Gln Leu Arg  
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 Ser Pro Gln Glu Glu Ala Leu Gln Arg Leu Val Asn Leu Tyr Gly Leu  
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 690 695 700  
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 Arg Glu Arg Gln Glu Leu Gly Ser Pro Glu Glu Arg Leu Gln Asp Ser  
 850 855 860  
 Ser Asp Pro Asp Thr Gly Ser Glu Glu Glu Gly Ser Ser Arg Leu Ser  
 865 870 875 880  
 Pro Pro His Ser Pro Arg Gly Glu Thr Leu Ala Glu Thr Trp Thr Arg  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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Pro Pro

<210> 4  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 4  
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 1 5 10 15

Ala Lys

<210> 5  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 5  
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<210> 6  
 <211> 6  
 <212> PRT  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

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<223> basic amino acid

<220>

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<222> (4)

<223> hydrophobic amino acid

<220>

<221> MOD\_RES

<222> (5)

<223> any amino acid

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<210> 7

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 7

Cys Pro Arg Arg Arg Ser Leu Pro Ala Gly Asp Ala Leu Tyr Leu Ser  
1 5 10 15

Phe Asn Pro Pro  
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<210> 8

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 8

Cys Arg Gln Ser Leu Leu Gly Ser Arg Arg Gly Arg Ser Ser Leu Ser  
1 5 10 15

Leu Ala Lys

<210> 9  
 <211> 19  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

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Leu Ala Lys

<210> 10  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
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<210> 11  
 <211> 27  
 <212> DNA  
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<220>  
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<400> 11  
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27

<210> 12  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence



<220>

<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 12

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<210> 13

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 13

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26

<210> 14

<211> 26

<212> DNA

<213> Artificial Sequence

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oligonucleotide

<400> 14

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<210> 15

<211> 6

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
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<400> 15

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5

<210> 16

<211> 27

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
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<400> 16

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<210> 17

<211> 32

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

<400> 17

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32

<210> 18

<211> 15

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 18

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<210> 19

<211> 19

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic  
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<220>

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<222> (12)

<223> phosphorylated Thr

<400> 19

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Ala Pro Glu

<210> 20  
 <211> 6  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<220>  
 <221> MOD\_RES  
 <222> (2)  
 <223> basic amino acid

<220>  
 <221> MOD\_RES  
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 <223> hydrophobic amino acid

<220>  
 <221> MOD\_RES  
 <222> (5)  
 <223> any amino acid

<400> 20  
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<210> 21  
 <211> 52  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
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Leu Asp Asn Phe  
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<210> 22  
 <211> 25  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<210> 23  
 <211> 17  
 <212> PRT  
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Ser

<210> 24  
 <211> 8  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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 <222> (3)  
 <223> any amino acid

<220>  
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 <222> (6)..(7)  
 <223> any amino acid and this range may encompass one or  
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<400> 24

Arg Arg Xaa Ser Leu Xaa Xaa Gly  
1 5

<210> 25

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<220>

<221> MOD\_RES

<222> (2)

<223> any basic amino acid

<220>

<221> MOD\_RES

<222> (4)

<223> any hydrophobic amino acid

<220>

<221> MOD\_RES

<222> (5)

<223> any amino acid

<220>

<221> MOD\_RES

<222> (6)

<223> Gly or Leu

<400> 25

Arg Xaa Ser Xaa Xaa Xaa  
1 5

<210> 26

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 26

gcggaattca tgtctcggat cgaatccctc a

<210> 27  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<400> 27  
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26

<210> 28  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<220>  
 <221> MOD\_RES  
 <222> (14)  
 <223> phosphorylated Ser

<400> 28  
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Pro Pro

<210> 29  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<220>  
 <221> MOD\_RES  
 <222> (4)  
 <223> phosphorylated Ser

<400> 29  
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     1                    5                    10                    15

Pro Pro

<210> 30  
 <211> 18  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<220>  
 <221> MOD\_RES  
 <222> (12)  
 <223> phosphorylated Tyr

<400> 30  
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Pro Pro

<210> 31  
 <211> 24  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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Arg Phe Ala Gly His Ser Glu Ala  
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<210> 32  
 <211> 49  
 <212> PRT  
 <213> Artificial Sequence

<220>  
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Pro Gln Arg Glu Pro Gln Arg Val Ser His Glu Gln Phe Arg Ala Ala  
                   20                  25                  30

Leu Gln Leu Val Val Asp Pro Gly Asp Pro Arg Ser Tyr Leu Asp Asn  
           35                  40                  45

Phe

<210> 33

<211> 56

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
           peptide

<400> 33

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Ser Trp Gly Ser Ser Ser Asp Gln Gln Pro Ser Arg Val Ser His Glu  
           20                  25                  30

Gln Phe Arg Ala Ala Leu Gln Leu Val Val Ser Pro Gly Asp Pro Arg  
           35                  40                  45

Glu Tyr Leu Ala Asn Phe Ile Lys  
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<211> 54

<212> PRT

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           peptide

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Gly Ala Leu Ala Gly Glu Asp Thr Gly Val Val Thr His Glu Gln Phe  
           20                  25                  30

Lys Ala Ala Leu Arg Met Val Val Asp Gln Gly Asp Pro Arg Leu Leu  
       35                  40                  45



Leu Asp Ser Tyr Val Lys  
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<210> 35  
<211> 8  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic peptide

<220>  
<221> MOD\_RES  
<222> (4)  
<223> Variable amino acid

<220>  
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<222> (7)  
<223> Variable amino acid

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<210> 36  
<211> 16  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic peptide

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<210> 37  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic peptide

<400> 37  
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1 5 10 15

<210> 38  
 <211> 14  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 38  
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<210> 39  
 <211> 15  
 <212> PRT  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
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<210> 40  
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<220>  
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<210> 41  
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<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

&lt;400&gt; 41

Arg	Arg	Gln	Thr	Arg	Val	Ile	Arg	Thr	Gly	Arg	Asp	Arg	Gly	Ser
1				5					10				15	

&lt;210&gt; 42

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Synthetic peptide

&lt;400&gt; 42

Arg	Arg	Arg	Val	Ser	Leu	Pro	Val	Ala	Met	Glu	Glu	Glu	Ile	Ala	Ala
1				5					10					15	

Leu Val

&lt;210&gt; 43

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Synthetic peptide

&lt;400&gt; 43

Pro	Arg	Arg	Leu	Ser	Leu	Gly	Ser	Pro	Glu	Ser	Arg	Ala	Val	Gly	Leu
1				5					10					15	

&lt;210&gt; 44

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Synthetic peptide

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; Variable or undetermined amino acid

&lt;400&gt; 44

Gly	Arg	Arg	Cys	Ser	Leu	Thr	Gly	Ser	Glu	Gly	Lys	Phe	Xaa	Gly	Leu
1				5					10					15	

Trp Gly

<210> 45  
 <211> 19  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 45  
 Pro Arg Arg Arg Ser Leu Pro Ala Gly Asp Ala Leu Tyr Leu Ser Phe  
       1                  5                  10                  15

Asn Pro Pro

<210> 46  
 <211> 21  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 46  
 Ser Arg Arg Arg Arg Phe Thr Ile Ala Asp Ser Asp Gln Leu Pro Gly  
       1                  5                  10                  15

Tyr Ser Val Glu Thr  
                   20

<210> 47  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 47  
 Ser Arg Arg Gly Arg Ser Ser Leu Ser Leu Ala Lys Ser Val Ser Thr  
       1                  5                  10                  15

Thr Asn

<210> 48  
 <211> 38  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 48  
 Pro Phe Leu Gln Leu Ala Tyr Gln Ser Ser Glu Val Leu Ser Glu Arg  
           1                  5                  10                  15  
 Gln Ser Leu Leu Leu Ser Gln Lys Gln His Gln Glu Leu Leu Lys Ser  
                   20                  25                  30  
 Asn Gly Ala Asn Arg Asp  
                   35

<210> 49  
 <211> 46  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 49  
 Ser Leu Arg Ser Lys Thr Thr Ile Arg Glu Arg Pro Ser Ser Ala Ile  
           1                  5                  10                  15  
 Tyr Pro Ser Asp Ser Phe Arg Gln Ser Leu Leu Gly Ser Arg Arg Gly  
                   20                  25                  30  
 Arg Ser Ser Leu Ser Leu Ala Lys Ser Val Ser Thr Thr Asn  
                   35                  40                  45

<210> 50  
 <211> 41  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 peptide

<400> 50  
 Gln Thr His Asp Ser Met Ala Ser Phe Ser Ser Ser His Met Lys Arg  
           1                  5                  10                  15

Val Ser Asp Val Leu Pro Lys Arg Arg Thr Thr Ser Ser Ser Phe Glu  
                   20                  25                  30

Ser Glu Ile Lys Ser Ile Ser Glu Asn  
           35                  40

<210> 51  
 <211> 44  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
           peptide

<400> 51  
 Gly Gln Thr Glu Pro Leu Pro Ala Glu Ala Pro Trp Ala Arg Arg Pro  
   1                  5                  10                  15

Val Asp Pro Arg Arg Arg Ser Leu Pro Ala Gly Asp Ala Leu Tyr Leu  
                   20                  25                  30

Ser Phe Asn Pro Pro Gln Pro Ser Arg Gly Thr Asp  
           35                  40

<210> 52  
 <211> 19  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
           peptide

<400> 52  
 Cys Arg Arg Arg Ser Leu Pro Ala Gly Asp Ala Leu Tyr Leu Ser Phe  
   1                  5                  10                  15

Asn Pro Pro